

## **IN THE CLAIMS:**

Please amend claims 1, 29, 37, and 38 as follows.

1. (Currently Amended) A method, comprising:  
determining, in an operational entity of a communications network, at least ~~one~~  
two transmit diversity ~~branch~~-branches for use based on estimated channel properties of  
at least two transmit diversity branches of a transmitter; and  
determining, in the operational entity of the communication network, a transmit  
diversity order of the at least two transmit diversity branches.

2. (Previously Presented) A method as defined in claim 1, wherein the  
determining comprises determining the at least one transmit diversity branch for use  
using a transmit diversity performance indicator defined for a transmit diversity branch  
set, the transmit diversity performance indicator being dependent on at least estimated  
channel properties of transmit diversity branches belonging to the transmit diversity  
branch set.

3. (Previously Presented) A method as defined in claim 2, wherein the  
determining comprises using the transmit diversity performance indicator taking into  
account one or more of the following:  
small-scale fading statistics, and specific channel coding.

4. (Previously Presented) A method as defined in claim 1, wherein the determining the at least one transmit diversity branch for use comprises taking into account a required outage probability.

5. (Previously Presented) A method as defined in claim 1, wherein the determining comprises determining the at least one transmit diversity branch for use based on said estimated channel properties comprising expected powers of transmit diversity branches.

6. (Previously Presented) A method as defined in claim 5, wherein the determining comprises evaluating a transmit diversity performance indicator using said expected powers.

7. (Previously Presented) A method as defined in claim 6, wherein the determining comprises calculating the transmit diversity performance indicator using a formula comprising:

$$\mu_k = \sqrt[k]{F_0 \prod_{m=1}^k \lambda_m},$$

where  $F_0$  denotes a required outage probability,  $\lambda_m$  denotes an expected power of an m-th transmit diversity branch in a transmit diversity branch set  $\Theta$ , and  $\Theta$  is a number of transmit diversity branch indexes in the transmit diversity branch set  $\Theta$ .

8. (Previously Presented) A method as defined in claim 6, further comprising:  
evaluating said transmit diversity performance indicator for various transmit diversity branch sets; and  
selecting for use the transmit diversity branch set having an optimum transmit diversity performance indicator value.

9. (Previously Presented) A method as defined in claim 8, wherein the evaluating comprises evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.

10. (Previously Presented) A method as defined in claim 6, wherein the determining comprises evaluating the transmit diversity performance indicator defining a branch power threshold to add a further transmit diversity branch to a transmit diversity branch set for use, the branch power threshold being dependent on the expected powers of the transmit diversity branches already selected to the transmit diversity branch set for use.

11. (Previously Presented) A method as defined in claim 10, wherein the determining comprises selecting the transmit diversity branches to the transmit diversity branch set for use in an order in accordance with estimated expected powers.

12. (Previously Presented) A method as defined in claim 1, wherein the determining comprises determining the at least one transmit diversity branch for use based on the estimated channel properties comprising second order statistics of channel coefficients of transmit diversity branches.

13. (Previously Presented) A method as defined in claim 12, wherein the determining comprises evaluating a transmit diversity performance indicator using said second order statistics.

14. (Previously Presented) A method as defined in claim 12, wherein the determining comprises using the second order statistics comprising at least one correlation matrix calculated using estimated channel coefficients.

15. (Previously Presented) A method as defined in claim 14, wherein the determining comprises calculating the transmit diversity performance indicator using a formula comprising:

$$\mu_{\Theta} = \sqrt[|\Theta|]{F_0 \prod_{m=1}^{|\Theta|} u_m},$$

where  $F_0$  denotes a required outage probability,  $u_m$  denotes an  $m$ -th Eigenvalue of a correlation matrix relating to a transmit diversity branch set  $\Theta$ , and  $|\Theta|$  is a number of transmit diversity branch indexes in the transmit diversity branch set  $\Theta$ .

16. (Previously Presented) A method as defined in claim 13, further comprising:

evaluating said transmit diversity performance indicator for various transmit diversity branch sets; and

selecting for use the transmit diversity branch set having an optimum transmit diversity performance indicator value.

17. (Previously Presented) A method as defined in claim 16, wherein the evaluating comprises evaluating said transmit diversity performance indicator for transmit diversity branch sets using a tree structure, a transmit diversity branch set relating to a child node having less transmit diversity branches than a transmit diversity branch set relating to a parent node of the child node.

18. (Previously Presented) A method as defined in claim 12, further comprising:

constructing virtual transmit branches as linear combinations of physical transmit diversity branches, and wherein the estimated channel properties comprise expected powers of said virtual transmit branches.

19. (Previously Presented) A method as defined in claim 18, wherein the constructing comprises constructing the virtual transmit branches as Eigenvectors of a

channel correlation matrix derived from estimated channel coefficients and expected powers of the virtual transmit branches are determined as Eigenvalues of respective Eigenvectors.

20. (Previously Presented) A method as defined in claim 18, wherein the determining comprises determining the at least one transmit diversity branch using a transmit diversity performance indicator defining a branch power threshold to add a further virtual transmit branch set for use, the branch power threshold being dependent on the expected powers of the virtual transmit branches already selected to the virtual transmit branch set for use.

21. (Previously Presented) A method as defined in claim 20, wherein the determining comprises selecting the virtual transmit branches to the virtual transmit branch set for use in an order in accordance with respective expected powers.

22. (Original) A method as defined in claim 1, further comprising:  
allocating transmission power evenly to physical transmit diversity branches or virtual transmit diversity branches selected for use.

23. (Original) A method as defined in claim 1, further comprising:  
transmitting information using transmit diversity branches selected for use.

24. (Original) A method as defined in claim 1, further comprising:  
estimating channel properties using channel coefficients at a transmitter.

25. (Original) A method as defined in claim 1, further comprising:  
estimating channel properties using channel coefficients at a receiver.

26. (Previously Presented) A method as defined in claim 1, wherein the determining comprises determining the at least one transmit diversity branch for use for a receiver independently of other receivers.

27. (Previously Presented) A method as defined in claim 1, wherein the determining comprises determining the at least one transmit diversity branch for a radio link independently of other radio links employed by a transmitter.

28. (Previously Presented) A method as defined in claim 1, wherein the determining comprises determining the at least one transmit diversity branch for use for a transmitter, for use with a receiver.

29. (Currently Amended) An apparatus, comprising:  
a processor; and  
a memory including computer program code,

the memory and the computer program code configured to, with the processor, cause the apparatus at least to

establish estimated channel properties of at least two transmit diversity branches, ~~and~~

determine, in an operational entity of a communications network, at least two transmit diversity branches for use based on the estimated channel properties, and

determine, in the operational entity of the communications network, a transmit diversity order of the at least two transmit diversity branches.

30. (Previously Presented) An apparatus as defined in claim 29, further comprising:

said at least two transmit diversity branches,

wherein the memory and the computer program code are further configured to, with the processor, cause the apparatus at least to transmit information over a radio interface using selected transmit diversity branches.

31 (Previously Presented) An apparatus as defined in claim 30, comprising:  
a base station of a cellular communications system.

32. (Previously Presented) An apparatus as defined in claim 30, comprising:  
a base station controller of a cellular communications system.



33. (Previously Presented) An apparatus as defined in claim 31, comprising:  
an access point of a wireless local area network.

34. (Cancelled)

35. (Previously Presented) An apparatus as defined in claim 29, comprising:  
a mobile station for a cellular telecommunications network.

36. (Previously Presented) An apparatus as defined in claim 29, comprising:  
user equipment of a wireless local area network.

37. (Currently Amended) An apparatus, comprising:  
establishing means for establishing estimated channel properties of at least two  
transmit diversity branches; ~~and~~  
determining means for determining, in an operational entity of a communications  
network, at least two transmit diversity branches for use based on the estimated channel  
properties; and  
determining means for determining, in the operational entity of the communication  
network, a transmit diversity order for the at least two transmit diversity branches.

38. (Currently Amended) A computer program embodied on a computer readable medium, the computer readable medium storing code comprising computer executable instructions configured to perform:

determining, in an operational entity of a communications network, at least ~~one~~ two transmit diversity ~~branch-branches~~ for use based on estimated channel properties of at least two transmit diversity branches of a transmitter; and  
determining, in the operational entity of the communications network, a transmit diversity order of the at least two transmit diversity braches.

39. (Previously Presented) A method, comprising:

determining at least one transmit diversity branch for use based on estimated channel properties of at least two transmit diversity branches of a transmitter,

wherein the determining comprises determining the at least one transmit diversity branch for use based on said estimated channel properties comprising expected powers of transmit diversity branches,

wherein the determining comprises evaluating a transmit diversity performance indicator using said expected powers,

wherein the determining comprises calculating the transmit diversity performance indicator using a formula comprising:

$$\mu_k = \sqrt[k]{F_0 \prod_{m=1}^k \lambda_m},$$

where  $F_0$  denotes a required outage probability,  $\lambda_m$  denotes an expected power of an m-th transmit diversity branch in a transmit diversity branch set  $\Theta$ , and  $|\Theta|$  is a number of transmit diversity branch indexes in the transmit diversity branch set  $\Theta$ .

40. (Previously Presented) A method, comprising

determining at least one transmit diversity branch for use based on estimated channel properties of at least two transmit diversity branches of a transmitter,

wherein the determining comprises determining the at least one transmit diversity branch for use based on the estimated channel properties comprising second order statistics of channel coefficients of transmit diversity branches,

wherein the determining comprises using the second order statistics comprising at least one correlation matrix calculated using estimated channel coefficients, and

wherein the determining comprises calculating the transmit diversity performance indicator using a formula comprising:

$$\mu_{\Theta} = \sqrt{F_0 \prod_{m=1}^{|\Theta|} u_m} ,$$

where  $F_0$  denotes a required outage probability,  $u_m$  denotes an m-th Eigenvalue of a correlation matrix relating to a transmit diversity branch set  $\Theta$ , and  $|\Theta|$  is a number of transmit diversity branch indexes in the transmit diversity branch set  $\Theta$ .

41. (Previously Presented) A method, comprising

determining at least one transmit diversity branch for use based on estimated channel properties of at least two transmit diversity branches of a transmitter, wherein the determining comprises determining the at least one transmit diversity branch for use based on the estimated channel properties comprising second order statistics of channel coefficients of transmit diversity branches; and

constructing virtual transmit branches as linear combinations of physical transmit diversity branches,

wherein the estimated channel properties comprise expected powers of said virtual transmit branches, and

wherein the determining comprises determining the at least one transmit diversity branch using a transmit diversity performance indicator defining a branch power threshold to add a further virtual transmit branch set for use, the branch power threshold being dependent on the expected powers of the virtual transmit branches already selected to the virtual transmit branch set for use.